Staff Summary
Method 2B Application

Clean Energy: Complexe Enviro Progressive Itee Lachenaie Landfill Gas from Montreal, Quebec, to Compressed Natural Gas, Liquefied Natural Gas, and Liquefied-Compressed Natural Gas Delivered in California (Pathway Codes: CNG048, CNG049, and LNG033)

Deemed Complete Date: May 15, 2015
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Pathway Summary

Clean Energy has applied for three landfill-gas-to-biomethane fuel pathways. The landfill gas (LFG) for all three pathways is extracted from the Lachenaie Landfill in Montreal Urban Community, Quebec, Canada. The first pathway covers the liquefaction of the resulting biomethane at Clean Energy's Boron, California liquefaction facility and the dispensing of the fuel as liquefied natural gas (LNG); the second pathway covers the liquefaction of the resulting biomethane at Clean Energy's Boron, California liquefaction facility and the subsequent vaporization and compression of the liquefied natural gas into compressed natural gas (L-CNG); and the final pathway covers the compression of the biomethane for dispensing at CNG fueling stations. All fueling stations covered by these pathways are located in California.

Because Clean Energy does not have two years of production data from the Lachenaie Landfill processing plant, the pathways discussed in this summary are provisional until the data has been received by staff and is used to confirm that the pathway CI is less than or equal to the CI in the table below. Clean Energy is required to submit operational data quarterly (effective the quarter after the original data was submitted) until the two year requirement is fulfilled.

LFG from the Lachenaie Landfill is treated using grid electricity and propane. Purified LFG is used in the thermal oxidizer and flare pilot. The thermal oxidizer and flare are used to destroy LFG when the processing plant is not fully operational.

The Clean Energy pathways utilize the CA-GREET1.8b default values for LFG recovery. To determine combustion emissions from the consumed purified LFG, the flare and the thermal oxidizer, the CA-GREET1.8b default values for natural gas combustion in a turbine were used. These emissions are more representative of operations at the Lachenaie Landfill plant than emission factors for a natural gas powered compressor.

The biomethane that Clean Energy purchases from the Lachenaie LFG processing plant is injected into the interstate pipeline system for conveyance to Clean Energy's LNG plant in Boron, California. The pipeline transport distance is 2,854 miles. As such, Clean Energy will be obligated to retain records that unequivocally demonstrate that the credits it earns under the pathways described in this Summary correspond directly with the volumes of biomethane it purchases from the Lachenaie Landfill in Montreal Urban Community, Quebec, Canada.

Carbon Intensity of CNG, LNG, and L-CNG Produced

As shown in table below, the applicant has calculated the CIs of its CNG, LNG, and L-CNG pathways to be 7.36, 11.84, and 13.96 gCO_2e/MJ, respectively.

Operating Conditions

1. Actual pathway energy consumption values shall remain at or below the levels specified in Clean Energy's application. These pathways were calculated using LFG production data from September 14, 2014 to November 30, 2014 and LNG liquefaction and CNG compression data covering calendar years 2011 and 2012. The recovery and processing efficiency levels at the Lachenaie Landfill in Montreal Urban Community, Quebec, Canada, shall remain at or above the levels specified in the Clean Energy's application[1]. In addition, the liquefaction efficiency at the Boron LNG plant and the compression efficiency level at the L-CNG stations in California shall remain at or above the levels specified in the application. Energy consumption values for these facilities are classified by the applicant as confidential business information.
2. Because the biomethane supplied under this pathway is commingled with fossil NG both when it enters the interstate pipeline system and when it enters Clean Energy's Boron liquefaction facility, Clean Energy must maintain an accounting system that will enable it to demonstrate unequivocally at any time that every unit of biomethane-based transportation fuel sold and reported under the LCFS can be associated with an equal unit of biomethane purchased from the Lachenaie Landfill.
3. Because Clean Energy does not have two years of production data from the Lachenaie Landfill processing plant, Clean Energy will submit quarterly (effective the quarter after the original data was submitted production data until staff is in receipt of records covering a full two years of production data from the Lachenaie Landfill processing plant. If these records indicate that one or more of the certified CIs shown in the table below are higher, staff may adjust the certified values upwards.
4. Clean Energy must provide signed statements from Lachenaie Landfill in Montreal Urban Community, Quebec, Canada and any party to whom it

[1] Clean Energy assumed recovery and processing efficiencies equivalent to those used in pathway LNG007: http://www.arb.ca.gov/fuels/lcfs/022709lcfs_lfg.pdf

conveys biomethane from the Lachenaie LFG processing plant attesting under penalty of perjury under California law that all environmental attributes, including the right to generate credits under the LCFS, are exclusively reserved to Clean Energy and that no party will claim or has claimed credit for volumes reported in California's LCFS program under any other governmental program except the federal RFS.

Proposed Lookup Table Entries

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity Values (gCO_2e/MJ)		
			Direct Emissions	Land Use or Other Indirect Effects	Total
CNG from LFG	CNG048	2B Application*: Quebec landfill gas to pipeline-quality biomethane; delivered via pipeline; compressed to CNG in CA	7.36	0	7.36
L-CNG from LFG	CNG049	2B Application*: Quebec landfill gas to pipeline-quality biomethane, delivered via pipeline, liquefied in CA; transported by trucks; re-gasified and compressed to L-CNG in CA	13.96	0	13.96
LNG from LFG	LNG033	2B Application*: Quebec landfill gas to pipeline-quality biomethane; delivered via pipeline; liquefied to LNG in CA	11.84	0	11.84

* Specific Conditions Apply.

Staff Analysis and Recommendations

Staff has reviewed clean Energy's application for the production of CNG, L-CNG, and LNG from LFG originating in Montreal Urban Community, Quebec, Canada. Staff has replicated the CI values calculated by Clean Energy using the CA-GREET1.8b spreadsheet. Clean Energy has provided documentation in support of the key components of its pathways: energy consumption at the Quebec LFG processing plant, the California liquefaction plant, and Clean Energy's California CNG fueling stations. It has also provided the volumes of LNG and CNG produced. Staff is satisfied that the energy consumption levels reported in Clean Energy's application accurately represent actual usage for the time period for which records were submitted, and that Clean Energy is capable

of maintaining CIs that are at or below those shown in the table above. Therefore, staff recommends that Clean Energy's application for Method 2B LFG-to-CNG, LFG-to-LNG, and LFG-to-L-CNG pathways be certified.